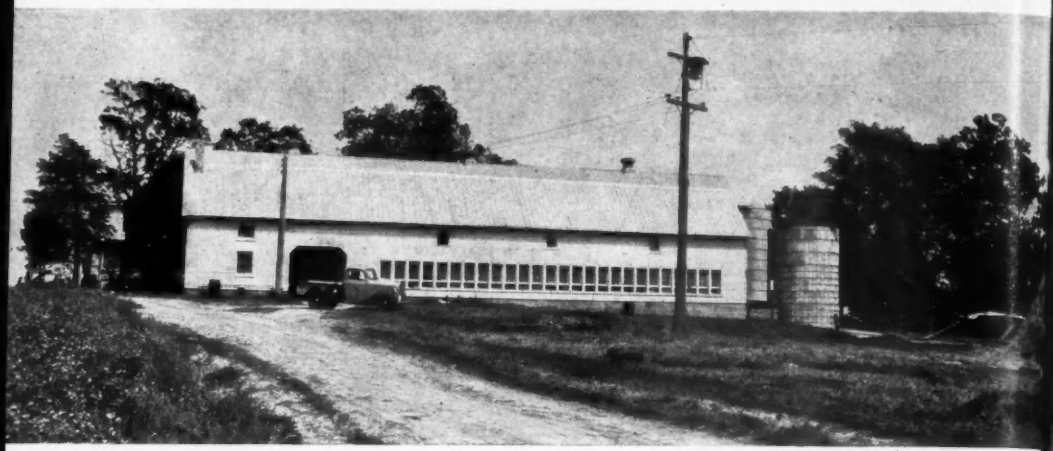
Electricity on the Farm

JANUARY
1939



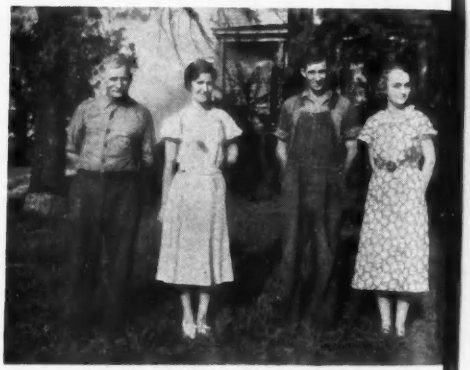
"We Make Electricity Pay Its Way"

Says Mr. W. H. Moore, R. D., Sabot, Virginia

"We make each piece of electric equipment pay for the next on our farm. Since our 354-acre dairy farm must support eight of us, I decided long ago that we had to operate it the most economical way—so we tried electricity.

"First we installed a milk cooler and an electric water system, which not only paid for themselves but saved us enough for an electric household refrigerator. Continuing this plan, we now have an electric iron, a dairy-utensil sterilizer, a host of small appliances, sewing machine, vacuum cleaner, two workshop motors, complete farm lighting, and a portable motor for hoisting hay, sawing wood, cutting ensilage, and grinding grain—all purchased with electrical profits.

"Thanks to electricity and the Virginia Electric and Power Company agricultural engineers, we are all now making a better living off our farm."



Mr. Moore, his daughter, his son, and his daughter-in-law electricity pay for itself on their 354-acre dairy farm

And, like Mr. Moore, thousands of other farmers are making electricity pay for itself. They find that the best way to be sure of enjoying savings from the use of electricity is to buy reliable equipment that economizes on current and operates dependably for years.

You, too, can make electricity pay its way on your farm. You'll always be glad you bought General Electric products, because they seldom cost more in the beginning and save you money over the years.

You will find some valuable information a electricity for your farm in General Electric farm book. May we send you a copy?

General Electric Company,

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Schenectady, N. Y.

I'd like a free copy of "Electric Helpers for the Farm Family."

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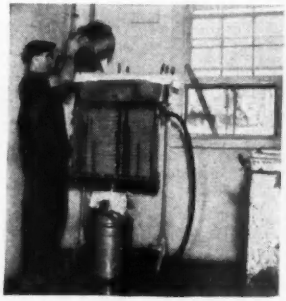

The Moores are proud of the modern milk room in their dairy

G-E portable farm motor being us hay on the Moore farm

GENERAL ELECTR

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ONE faucet requires from 2 to 3½ gallons of water ***per minute.*** When, as frequently happens, TWO or THREE faucets are opened at the same time, the ***demand per minute*** is doubled or trebled. Translate this into ***rate per hour*** and it is obvious that any water system with a pump capable only of delivering 175 to 185 gallons per hour or less, could not possibly keep up with this demand. One might truly call a water system of such limited capacity a "one faucet" or "squirt gun" system. Would YOU be satisfied with running water service so meagre? If your answer is NO, assure yourself ***full satisfaction*** by purchasing a precision built MYERS Water System, designed always with AMPLE CAPACITY to meet the many uses for which it is recommended.

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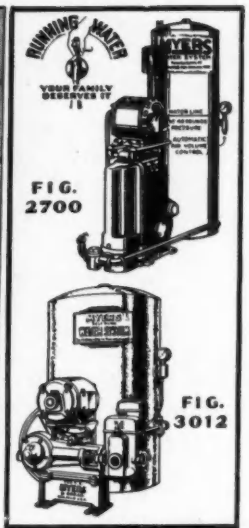

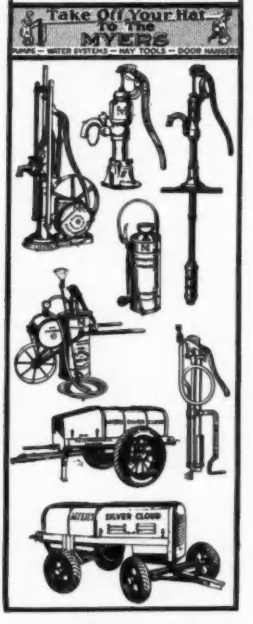

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Editor's Chat

GUZINTO

If you have a boy in school, you'll understand "guzinto." Five goes into 25, five times. x goes into $2x + xy$, $2 + y$ times. Third grade or ninth, they all struggle with guzinto. And even you and I - -.

There's the rent, the gas bill, the groceries, the phone, the car, the doctor, the fuel oil, the carfare, the - -, the - -. I add it all up and see if it goes into the monthly earnings. GUZINTO! It does! Or GUZINTO!! It don't.

Along about this lull-spell when the New Year's resolutions are still holding, most farm folks start doing a little guzinto. There's the earnings of last year and the prospects for the new. There's a few old bills and a heap of needs and desires. Guzinto??

These are real problems of arithmetic applied to life. Clothes, dentist' bills, combines and electricity are some of the divisors. Strange as it may seem, I would not put electricity first on the budget list. There's health, food, education,- - -, - - -. You must "roll your own" budget, but when you have listed the items, look them over. You may be surprised at what a helpful part electricity can play in this game of guzinto. For instance, how could electricity, intelligently used, reduce the budget for health, food, education, insurance? Well there's refrigeration, running water, eye saving illumination, radio, fire-safe light.

Don't buy the first gadget offered. Electricity will do many things economically. Study your needs and the possibilities. Plan for the year. Distinguish between unremunerative *expenditures* and *investments* for economy, health or profit. You will find that where electricity is used wisely as a *divisor* you can end up with a *dividend*, - - and a shout, GUZINTO!

BOYS, BULLS AND BARLEY

The usual crowds filled the Chicago hotel lobbies December first. Boys and girls—thousands of them, and grown boys and girls from the colleges and farms were everywhere. It was the occasion of the International Livestock Exposition and the many conventions which accompany it.

The International is an inspiration. Excellence is there—excellence in livestock, in grain and seeds, in farm boys and girls; and excellence in achievement. The excellence is not always an accompaniment of wealth. It is a mark of intelligent effort; of determination. A boy from a modest Mississippi farm is National 4-H Club Champion in rural electrification. Electric service came to his father's farm only recently.

There are champions this year, but not all the bridges are crossed. A few years ago someone proved hybrid seed corn. Now look. Our Canadian farmer friends win most of the small grain and seed championships from us.

The perfection of stock and seed displayed at the International represents as profound and scientific study and development as may be seen in any industrial exhibit. Its ramifications are more intricate and challenging. This is a FARM show—not for show, but for progress.

—I'm proud I am a farmer—

GRINDERS AND CHOPPERS

There is under way a gradual but persistent change in types of feeds and in feed handling. The mention of grass silage, irrigated pastures, chopped hay and mineral supplements will suggest what I mean. At this season you are grinding feed. Which is best: large grinders and scoops or small grinders and chutes; large motors or small motors; freshly ground feeds or supplies ground in advance; hauling to the mill, custom grinding or your own grinder? The answer may be different for different farms. But, there *is* an answer, and it is worth pondering. It involves hours and dollars as well as good feed and good practice.

George Kable

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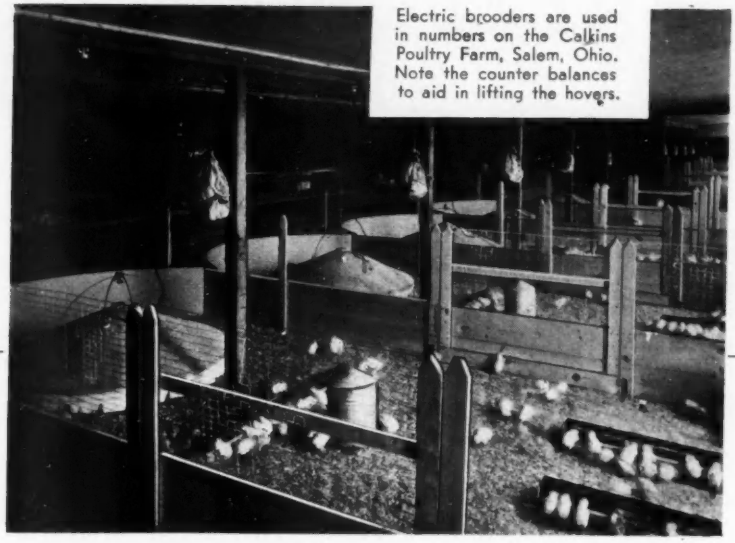


Electric brooders are used in numbers on the Calkins Poultry Farm, Salem, Ohio. Note the counter balances to aid in lifting the hovers.

WHERE WE STAND ON ELECTRIC BROODING

Costs of Brooding—Types of Brooders—Advantages and Disadvantages of Electric Heat—Brooding at Low Temperatures—The Kind of Brooder to Buy

By I. P. BLAUSER

Mr. Blauser Is Extension Agricultural Engineering Specialist at Ohio State University, Columbus, Ohio.

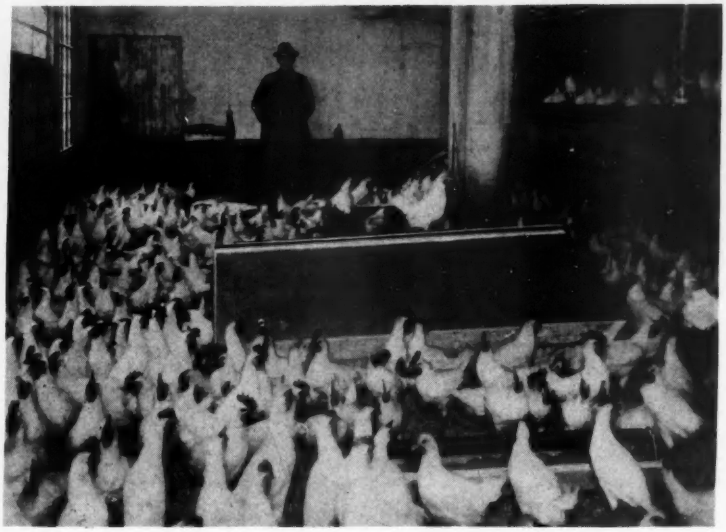
A RECENT check-up on the sale of brooders by one of the large power companies in Ohio shows that 75% of all brooders being installed are electric. Present indications are that the proportion of electric brooders sold in their territory will reach 90% before long.

Electric brooding is no longer considered as an experiment in Ohio. There is probably no better testimony for electric brooders than the growth of their use during the past five years. This, I believe, is particularly significant in this state because many of the first installations did not prove satisfactory for various reasons, the chief reason being the operator himself, while in a number of instances poor design and construction gave inferior results and costly operation.

I remember several years ago on one of our farm electric tours in Clinton County in early March, we stopped at the Peterson Brother's farm where an electric brooder was being used for the first time. As in a good many other cases the care of the farm poultry fell to the lot of the farm women. Mrs. Peterson saw the possibility of cutting down on labor by the use of an electric brooder. She was not entirely convinced, however, that the electric brooder would be satisfactory, so she had it put in on trial. Day-old chicks were secured from a local hatchery the last week in February. The temperature was hovering around 20 degrees above zero.

The electric hover was set up in what was an average or better-than-average brooder house. Mrs. Peterson had the brooder in operation a day or more before she got the 300 day-old chicks. The temperature under the hover was easily maintained at 100° but the brooder house seemed to Mrs. Peterson to be too cold for her newly purchased chicks. So she decided that rather than take a chance of losing part or all of the chicks during the first night she would spend the night in the brooder house watching over them. The chicks came through in good shape without any loss, but Mrs. Peterson did not fare so well as she contracted a bad cold and spent the next several days in bed.

When the farm electric tour stopped at the farm, Mrs. Peterson was happy to tell the people about her experience, and also show the fine flock of chicks that she was raising. An electric meter on



Alert testimony for a job well done

the brooder enabled her to point out the daily cost of operation, and the fact that it was no more than for the coal brooder she previously used. From Mrs. Peterson's enthusiasm for the electric brooder, one might have been inclined to believe that she had the agency for the brooder she was using. I know that that was not the case.

Types of Brooders Available

There are two general types of electric brooders: the battery type brooder and the colony or hover type. The battery type brooder consists of several sections placed one above the other, so that a maximum number of chicks can be accommodated on a minimum of floor space. The use of the battery type brooder is confined very largely to commercial hatcheries in starting chicks or holding them until they are sold, but not to exceed two or three weeks, and to the so-called broiler factory, which raises broilers on a large scale with a minimum of space. The battery brooder has proved very satisfactory for those applications, but up to the present time has had only a very limited use in general brooding.

The hover brooder is the type that is used almost exclusively on farms. It is an individual brooding unit, with a heating element controlled by an automatic switch or thermostat, with various means for conserving the heat under the hover and supplying needed ventilation. The shape of the hover may be round, square, rectangular or oblong, and in most cases with the top slope of the hover steep enough to make it difficult for the chicks to roost on it.

Hover type brooders are further classified as: Electric lamp heated brooders, under-heat brooders, contact heat brooders, curtainless brooders, overhead heat brooders, and fan ventilated brooders. Each of these types of brooders has produced good results for some users, but not all have produced uniformly good results for a wide range of brooding conditions. A large percentage of the brooders being sold at the present time are of the overhead heat type, either with or without fan ventilation. The heating elements may be either of the red heat or black heat type. The black heat type operates at a lower temperature, and there is only rarely a failure of these heating elements. If a red heat type of element is used, it is deisrable to keep an extra element on hand, as they are more likely to burn out after several years of use. In cases of emergencies, high wattage light bulbs may be used temporarily.

Users of electric brooders and Agricultural Experiment Station workers have found that the electric brooder has a number of advantages over brooders using other types of heat. These advantages—of varying degrees of importance—have been given as: (1) Distinct saving in labor due to automatic control, and no handling of fuel or ashes. (2) Reliable automatic heat control regardless of change in weather. (3) Better chicks raised with less mortality. (4) Heavier growth at a given age of development. (5) Promotes early feathering of chicks. (6) Electric heat does not use up the oxygen of the air, or give off fumes. (7) Fire hazard reduced to a minimum. (8) With electricity at 3c per kilowatt-hour, compares very favorably with other heat.

The following have been given as disadvantages, or retarding influences to the more general use of electric brooders: (1) Poultrymen usually must change their methods and habits. (2) The high cost of a good, well designed, well built brooder. (3) High electric rates. (4) Moisture on floor and under hover. (5) Electric service might go off. A number of these difficulties have been practically eliminated and others have been greatly diminished during the past several years. Electric rates have been reduced so that 3c electricity for brooding is available in many places; and the greater the use, the lower the rate. The continuity of electric service is now such that current outage is a very rare occurrence, and the service is still being improved. A power-off alarm is desirable to give a warning in case the power supply should go off for any reason. One of the several emergency measures can then be taken to protect the chicks until the service is restored.

Brooding in Cold Climates

Electric brooders are now being used successfully in every section of the United States. Since the electric hover type brooder is so designed to keep the space under the hover at the desired temperature with a minimum loss of heat, the brooder house stays cool. Thus electric brooding is quite

These chicks are less than one week old. Note the parallel arrangement of the feeders with the ends toward the brooder, which makes it easy for chicks to return to the hover.

frequently referred to as cool-room brooding. Only in extreme low temperatures is it desirable or necessary to supply auxiliary heat in the brooder house. Satisfactory results have been secured with outside temperatures below zero without auxiliary heat. It may be desirable, however, to have some auxiliary heat if the temperature gets down to 10 degrees above zero, unless extra precautions are taken to see that the chicks are kept comfortable.

No special type of brooder house is necessary for the electric brooder, the room, however, should be free from drafts, should have means for ventilation and the floor should be protected from underneath cold, even to the extent of using insulation on the floor if necessary.

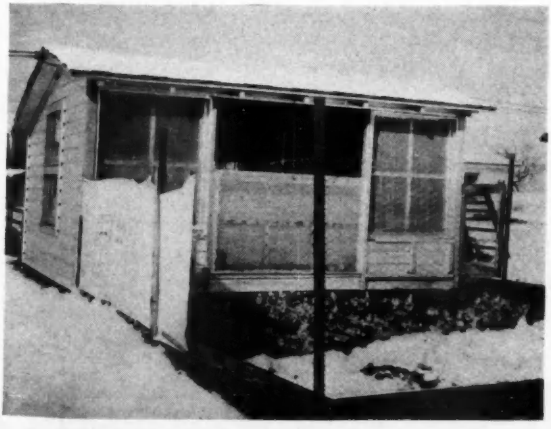
In a number of cases excessive moisture under the hover, on the floor and on the walls, have been reported. Some electric brooders have more trouble than others, but usually the trouble can be remedied by proper ventilation of the hover and also of the brooder house, and by changing the litter somewhat oftener than with other types of brooders.

The cost of operation of the electric brooder is a factor in selecting a brooder. A number of things affect the operating cost per chick per season of electric brooders. The more important factors are these: (1) Design and construction of the brooder with emphasis upon insulation, ventilation, and curtains. (2) Time of year, outside temperature, hover temperature, and length of brooding season. (3) Brooder house, insulated floor, freedom from drafts. (4) Number of chicks brooded, and mortality (many authorities state that 300 chicks is the largest practical unit). (5) Electric rates. (6) The poultryman himself; management may make the difference between success and failure.

Records gathered from throughout the United States show that the average consumption of electricity for electric brooding varies from ½ to 1½ k.w.h. per chick per season, depending upon the factors mentioned above. We have individual records showing very low consumption. For example: Mr. Louis Tangeman of St. Marys, Ohio, brooded 1,200 chicks during late spring of 1938 with four electric brooders at a cost of only 1/5th k.w.h. per chick, and with a very low mortality; —and this was Mr. Tangeman's first experience with electric brooders.

Good electric brooders, when properly managed, are producing high-quality chicks, with low mortality, and at a cost that compares favorably with other types of brooders. Since electric brooding has pretty well established itself, there seems to be a feeling on the part of many prospective purchasers that all brooders will give the same results regardless of the price of the brooder. The poorly insulated brooder may be lower in first cost, but higher in operating cost, and may not furnish sufficient heat for cool room brooding. That is sure to give inferior or disastrous results.

The electric brooder has eliminated much of the careful watching necessary with other brooders. It must be recognized, however, that no machine is completely fool-proof. Good management and attention to operating instructions will be well rewarded in lower costs and better results.



Yes, they grow up as sturdy, thrifty chicks under electric hovers, even in wintry weather. Out to toughen up—then in to warm up.

ELECTRIC SOIL STERILIZER for $69.14

Kills Plant Disease Spores, Harmful Insects and Weed Seeds. For Plant Growers, Nurserymen and Florists

By M. S. SHOOP

Miss Shoop is one of Southern California Edison Company's rural electrification boosters.

THE business of growing flowers and vegetables has been made profitable in recent years by several scientific methods based on use of electricity. Soil heating and the use of artificial light to stimulate and control growth have become accepted means of producing sturdier plants in a shorter space of time. In this way, production not only is increased, but plants can be counted on being ready for the market at an early date, thereby commanding highest prices.

Soil sterilization is electricity's newest contribution to the efficiency of the nursery business. It is being adopted by commercial growers primarily for its ability to control the troublesome damping off of seedlings, a source of one of the greatest annual losses in the business. Soil sterilization also brings other advantages. It eliminates weeds, which in many cases pays for the installation. It kills harmful insects and soil borne diseases. It produces a more even and healthier growth in both potted plants and cut flower crops. And many seeds which are difficult to germinate will do so more readily in sterilized soil.

The Blakesley Botanical Gardens, Santa Barbara, Calif., widely known for its collection of native California plants, is a progressive nursery which is using electric soil sterilization. Under the supervision of M. Van Rensselaer, director of the Gardens, and a representative of the rural electrification department of the local power company, an electric sterilizer was built at the reasonable cost of $69.14. The main compartment is of wood and is 28 inches wide, 29 inches deep and 30 inches high, with wooden legs 18 inches high. The bottom is hinged so that it may be dropped to release the sterilized soil. The box holds one-half cubic yard of soil.

Heating elements are of the calrod brass fin type. They are arranged in four sections rated at 750 watts each, placed approximately three inches from the sides, top and bottom of the box. Because of the type of construction, sterilization is completed in a reasonably short time.

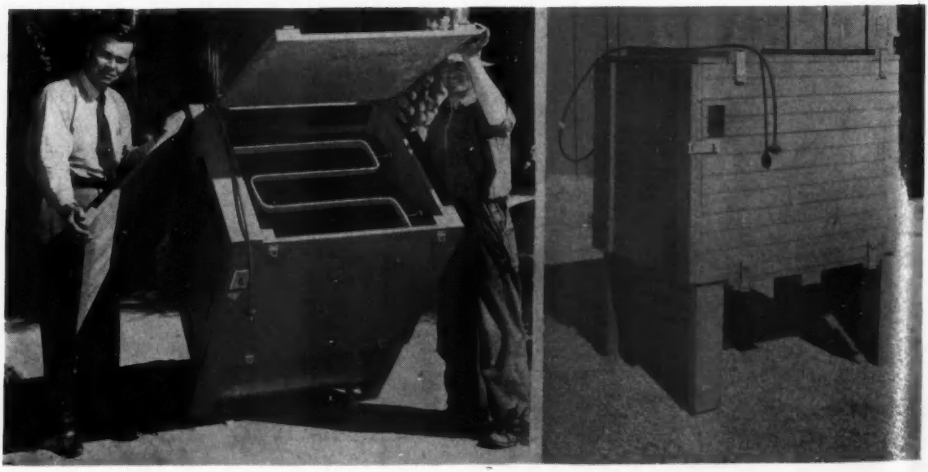
The total cost of the sterilizer is divided as follows: lumber, $13.54; labor, $8.00; heating units and installation, $47.60.

Inclusion of a soil heating thermostat and relay make a soil sterilizer even more efficient. The thermostat should be adjustable for temperatures up to 212 degrees. A circuit should be employed which keeps the current off after the thermostat has opened the circuit, until it is again re-set. For most purposes it is necessary only to bring the soil to a temperature of about 180 degrees to achieve the desired results.

Sterilization with electricity is simple and dependable. It does not puddle the soil, and leaves it in fine condition to handle and work. Electricity's adaptability to automatic control makes it a most advantageous method of soil sterilization.

Left: The sterilizer, showing its construction. Zig-zag calrod heating element on the inside. All wiring connections made inside the door on the left. Simple, sturdy, easy to build.

Right: This shows the sterilizer closed ready to be plugged in. The top of the box is hinged to receive the soil. The hinged bottom, held up by hasps, makes it easy to dump.

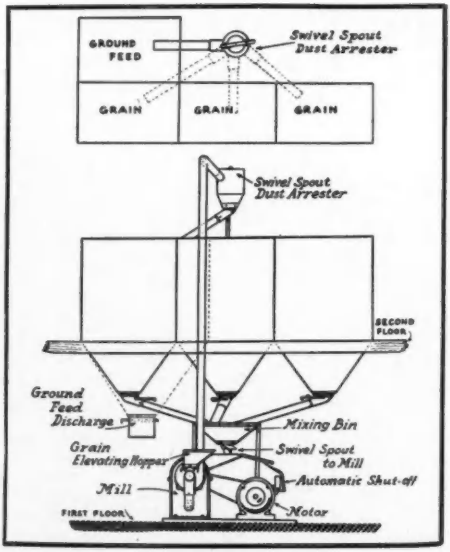


FEED GRINDING
ON THE
WENDIG PROVING FARM

THE Charles F. Wendig farm is a 164 acre place 35 miles north of Philadelphia. Ten years ago it was an abandoned farm locally known as "bum's roost" because it was a hang-out for tramps. Then came Charles Wendig, his sister and her husband, C. H. Otte. The partnership has flourished and today "bum's roost" is an attractive, prosperous and well equipped farm. Recently it was selected as a proving farm for electrical equipment devoted primarily to the poultry business.

There are many things of interest electrically on the Wendig farm. The electric kitchen has all modern conveniences. The cabinets are locally built, are attractive and up-to-date, and they look as if they belong on the farm. Sterilamps are being used experimentally in the brooder house and hen house for reducing the germ population of the air and increasing calcium assimilation of the birds in cold weather. Then there are electric brooders, water warmers, fan ventilation in the hen houses, electric egg cleaners and graders, a "light conditioned" house and all of the usual appliances.

It is the feed grinding installation, however, that we want particularly to tell about in this article.



A suggested layout for an automatic grinding installation. With an arrangement similar to this, a small mill will do a big grinding job at low cost.

Mr. Wendig starting his small grinder. The ground grain is blown into an overhead bin.

Previous to electrification the feed grinding equipment consisted of a 30 h.p. grinder and a tractor. Two men were required to grind feed.

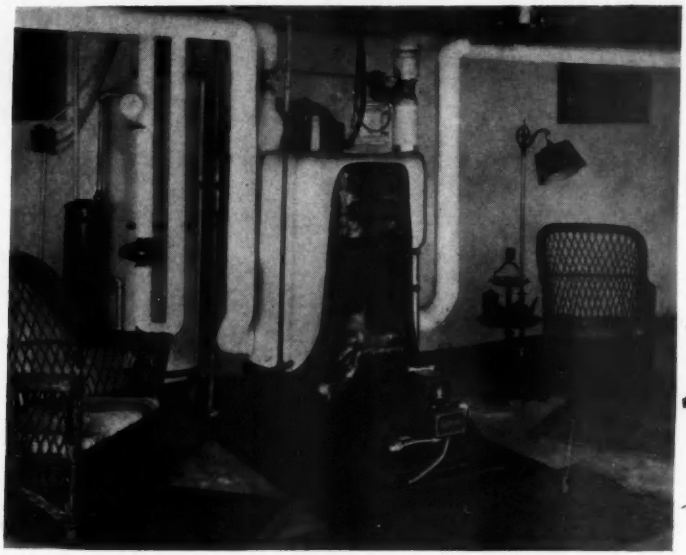
The new equipment consists of a modern hammer type mill driven by a 2 h.p. motor mounted on a two wheel truck. The motor is pivoted in place at the mill and the weight of the motor keeps the V belt tight. This little outfit does all the work of the larger grinder and does it cheaper and with less labor. Overhead bins are arranged for spouting grains down into the hopper of the mill. When the feed slide has been set for the correct rate of grinding, the operator may go on about his chores and leave the grinding to the motor. The little mill will handle all small grains and shelled corn by automatic feeding. Ear corn must be hand fed. In grinding with a 1/8 inch mesh screen the mill will produce ground feed at the following approximate rates per hour: Wheat, 700 lbs.; shelled corn, 700 lbs.; oats, 180 lbs.; and ear corn, 450 lbs.

A special hopper is provided for use when it is desired to elevate grain without grinding. The grain is fed directly into the blower, which has a capacity of 40 to 50 bushels per hour, blowing to a maximum height of 50 feet.

Mr. Otte has made a comparative cost study in grinding 1900 lbs. of corn, oats and barley with the two grinding outfits. Here are his figures:

	Tractor	Motor
Time used in preparation	34 min.	15 min.
Grinding time	1.3 hrs.	3.8 hrs.
Power cost for 1,900 lbs.	35c	14.5c
Man hours required	3.33	0.25

The 2 h.p. motor is easily moved about and is being used to operate a cylinder corn sheller and will furnish power for hoisting hay next summer.



Oil burner installed in round cast iron hot water boiler. Basement turned into living room and library.

Oil Burner for Comfort, Health and Convenience

By ARLEN MARSH

SEVERAL months ago, a popular magazine printed a cartoon of a family gathered in the living room. Said the woman to the head of the house: "It must be winter. I just heard the oil burner start."

The cartoon was as much truth as fiction. During the last ten years, automatic heating has progressed so far that about the only way you can tell that winter has begun—if your house is heated by an oil burner—it to step outside to see. You'd never know by staying in the house!

For oil burners nowadays start automatically. Once the thermostat—a sort of educated thermometer that lets you vary the weather to suit yourself—is set, the oil burner starts in in the fall and maintains the temperature you want throughout the winter. Generally, you don't have even to look at the burner once during the cold season!

Although heavy taxes have been clamped on fuel oil refiners by States and the Federal Government, the oil needed by a domestic burner isn't particularly expensive. The cost varies, of course, with your geographical location: if you live in Minnesota, fuel oil is apt to cost more than it does, say, in Texas or southern California. But you face the same problem burning coal or coke. Transportation largely governs costs no matter what sort of fuel you use.

From Michigan, R. O. Hansen reports that it costs him only $147 to buy the 1,650 gallons of oil required to heat his ten-room house, "Bloomfield Hills." This may seem high. Mr. Hansen explains it by commenting, "We have an even temperature throughout the house and are able to maintain a nice even humidity at all times."

Mr. Hansen, you see, has a rather special oil burner. He uses an oil-burning furnace, and working in connection with the furnace he has an "air-washer" which puts just the right amount of moisture into the air. The Hansens aren't troubled by dry, unpleasant air—the sort of air that causes so many colds and flu during the winter months.

"Bloomfield Hills" is a large place, and it's located in a cold climate. A great many farmers haven't the rigorous winter to face that must be met each year by Mr. Hansen's oil burner. Take Harry H. Sutherland, for instance, who is located down in *southern* Michigan—Ypsilanti is his mail address.

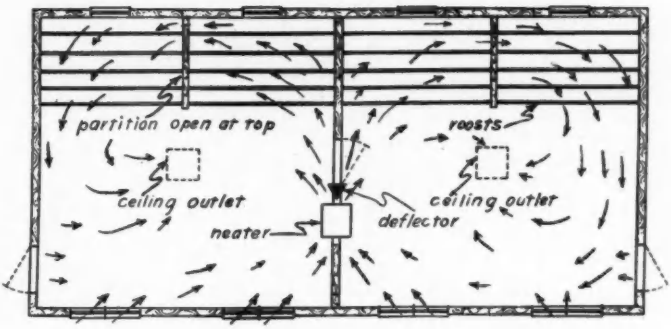
"The oil burner installation was made on October 17," Mr. Sutherland told me last spring, "and the whole house has been heated to an average temperature of 70 degrees at a cost of $72. I've used 900 gallons of fuel oil for the seven rooms in the house."

Costs aren't everything, however. Health, comfort, and convenience count for a great deal. The even temperatures maintained by oil burners are good for you, whether or not you use your burner with an air-washer the way Mr. Hansen uses his. Children can play comfortably in the coldest weather; you don't feel cold when you sit to sew or read.

And there's another big item in favor of elec-

(*More on page* 17)

ELECTRIC HEAT PRACTICAL for POULTRY HOUSES



Floor plan of laying house showing location of heater and ventilation outlets.

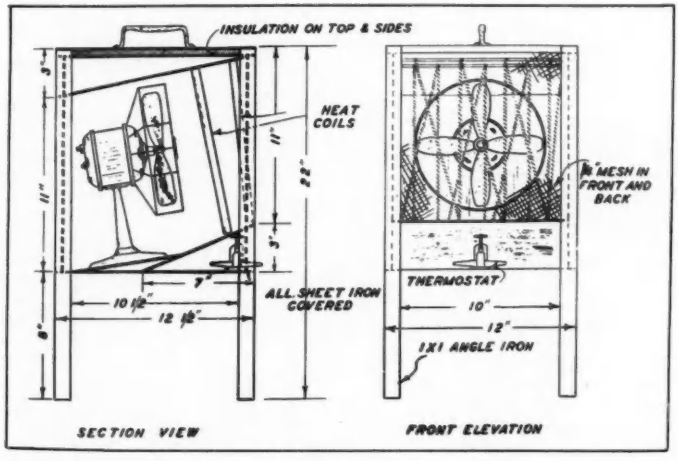
By HOBART BERESFORD

Mr. Beresford Is Head of the Department of Agricultural Engineering, University of Idaho, Moscow, Idaho.

ELECTRIC heat in poultry laying houses has proven practical from the standpoint of frost protection, as an aid to ventilation, humidity control and all around comfort to the flock. The standby feature brings peace of mind to the poultryman, who does not worry about sudden temperature drops when he knows that supplementary heat is available in laying pens or brooder houses.

The convenient type of circulation air heaters equipped with a thermostat control produces the simple answer to the re-circulating and warming or tempering of air in the poultry house under winter conditions. One of the most acceptable phases of this application of electricity to poultry production is the fact that the heaters may be installed as a standby service, with the thermostat set at 35 or 40 degrees Fahrenheit, making the heat available when low temperatures actually occur in the laying pens.

Three years of work with various types of heaters at the University of Idaho in cooperative projects between the Department of Poultry Husbandry and Agricultural Engineering have revealed that a heater which circulates a relatively large volume of air with a relatively low rise in temperature is more desirable than one which circulates less air but raises the air to a higher temperature. There are two good reasons for this. First, the heater which circulates the large volume of air may be placed in the house so as to aid natural circulation, which is very desirable during damp weather, and second, circulating a larger quantity of air past the heating coils keeps them from becoming hot enough to be a potential fire hazard. The heater should be so designed that the heating coils never become hotter than a very faint red, preferably a black heat. Brief specifications for an electric heater for use in laying-house ser-



Plan for home-made heater.

vice based on results of this investigation call for a heater having a 1,000- to 1,500-watt heating element equipped with a fan capable of circulating from 200 to 225 cubic feet of air per minute, the operation of the heater to be controlled by a suitable thermostat. Such a heater, costing approximately $15.00 may be used in the laying house and also during the brooding season. A 1,000- to 1,250-watt heater has sufficient capacity to warm the air in an insulated laying house 20 x 40 feet in plan or in a house having a volume of approximately 5,000 cubic feet. As a basis for calculating the number of heaters necessary, allow 100 to 150 watts for every 500 cubic feet of volume. It should be emphasized that the house must be well constructed and insulated.

During the investigation, it was found to be not only practical but desirable during extremely cold weather to diminish the quantity of air normally allowed for ventilation in order to conserve heat and electric energy. No bad effects were noted as a result of this system of management.

If electric heating of the laying house is contemplated, the electric wiring in the house should be carefully inspected by some one familiar with that type of work. It is important that the electric wires be large enough to carry the load added by connecting the heaters to the circuit without heating the wires or causing an excessive voltage drop. If the wire in the building which is to be heated electrically is No. 14, intended for only the relatively low light-load, it would be better practice to install a separate heater circuit of No. 10 or No. 12 wire, depending on the number of heaters to be used and the distance the poultry house is from the main distribution panel. Any competent electrician will be able to recommend the correct wire size. It will be much more convenient to have the heaters on a circuit independent of the lights, so their operation may be controlled by a thermostat.

Commercial heaters of this type are now available, and in most communities rates for electric energy are low enough to make the operation of such heaters economically possible. The cost of operation of electric heaters in installations where their use is recommended will not exceed the cost of supplying heat by other means, and the first cost will be considerably less. The convenience, safety, and automatic operation of electric heaters are factors which also should be given consideration.

STIFF AS MOLASSES IN JANUARY

By J. C. SCOTT

THERE is no telling what some of these farm electrification specialists will be using electric hotbed wire for next. In the beginning, it was developed and manufactured for the purpose of keeping soil warm in hotbeds and greenhouses.

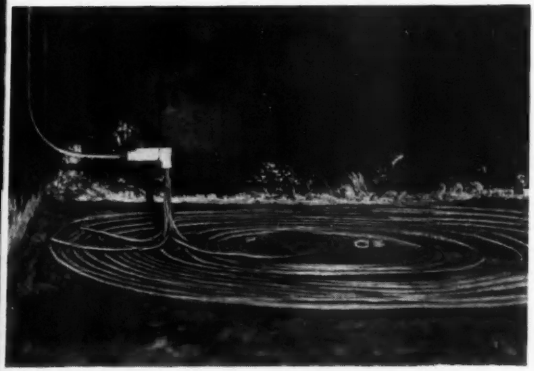
Then a farm electrification man figured that this wire should be used in poultry watering troughs to keep the water warm, and another one tried it in the stock watering troughs and found that it worked, and worked well.

Only recently Karl Dimmitt of one of the Northwest power companies found that it is just the thing to warm molasses for mixing with stock feed.

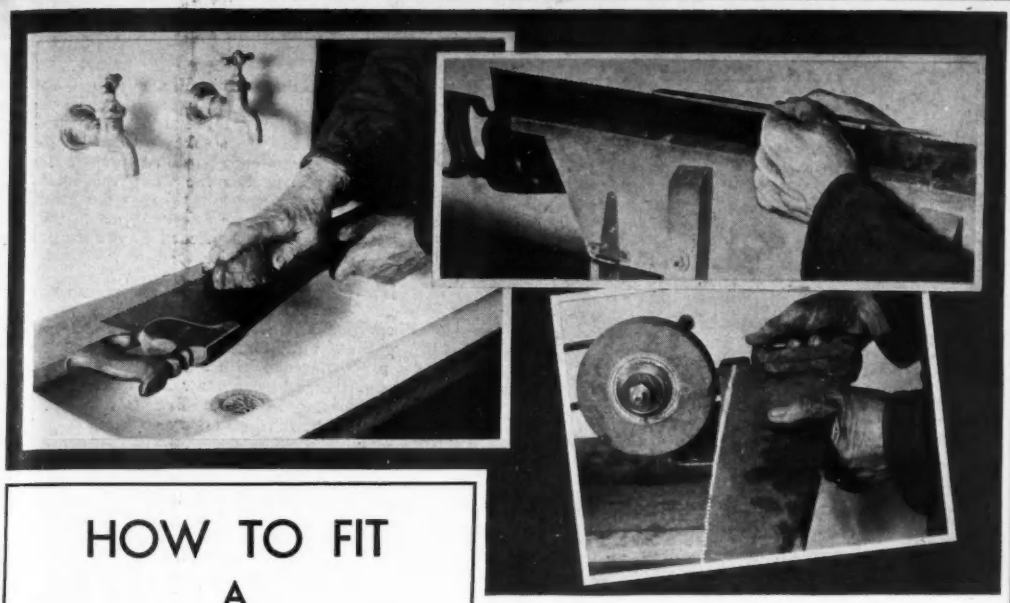
Here is the way it happened that hotbed wire is now being used to warm molasses. Mr. C. E. Goodwin, miller of the Walters Feed Mill Corporation at Bothell, Washington, wanted to mix molasses with the stock feed, but he found it impossible, or at least impractical in the cold weather because the molasses was so hard that it simply could not be forced through the pipe and nozzle for mixing. At the Walters Feed Mill they have a molasses tank which has a capacity for 52,000 gallons. The molasses is pumped out of this tank with a rotary pump at 60 pounds pressure through a nozzle into the feed.

But last winter the molasses in this tank became almost solid on account of the cold weather. Mr. Goodwin, the miller, asked the farm electrification man if the molasses could not be warmed up by electricity. Mr. Dimmitt figured that it could. He laid hotbed wire on top of the cold molasses. The hotbed cable consisted of No. 19 lead covered cable. There were two 120 ft. lengths on a 220 volt circuit using a total of 1600 watts or 800 watts on each length. The current was turned on and these hotbed wires slowly sank through the molasses until they reached the floor of the tank. After 36 hours the molasses was thinned down and the day's run was about six tons of molasses which was pumped out and mixed with the feed very satisfactorily.

Mr. Goodwin says that the electrical solution to his problem was most satisfactory from the standpoint of economy and efficiency, to say nothing of the elimination of fire hazard. It required about 10 kilowatt hours of electricity for each ton of molasses.



Two 120-foot lengths of soil heating cable thinned down the molasses in this large tank so it could be mixed with feed in cold weather.



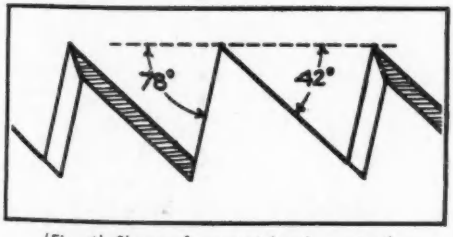
HOW TO FIT A CROSSCUT HAND SAW

By L. M. ROEHL

Upper left: (Fig. 1) Cleaning a saw with pumice stone and water.
Upper right: (Fig. 2) Jointing a hand saw.
Lower right: (Fig. 3) Grinding a straight edge on an old saw.

THE first point in fitting any saw is to clean it if necessary. Sandpaper or emery paper is not desirable as they scratch the surface. Lump pumice stone and water used as illustrated in Fig. 1 is a good method. The pumice stone is fine grit and does not scratch the surface yet removes rust rapidly. The saw blade is placed on a flat surface in the shop sink and a light stream of water run on the blade to rinse off the rust as loosened by the stone.

The second step in fitting the saw is to joint it. This is done by running a flat file over it lengthwise as shown in Fig. 2. The file must be held at right angles to the side of the saw, which is placed with the teeth up about an inch and a half above the jaws of the clamp to leave room for the fingers. The operator stands at one end of the saw and holds the file in both hands, with the thumbs on the file and the index fingers under the file and pointing toward him. By holding it in this way he can feel, as well as see, that he is holding the file at right angles to the sides of the saw.



(Fig. 4) Shape of crosscut hand saw teeth.

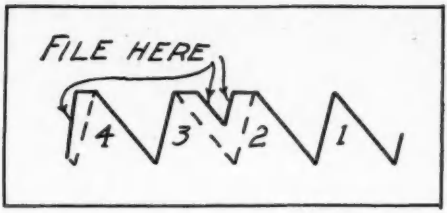
The purpose of jointing is to bring the points of all teeth to a line. This may be done with one stroke of the file or several may be needed. To determine if all teeth have been touched the saw is held toward a light. All teeth that have been touched by the file show a bright, flat surface at the tip. The jointing must be continued until all points have been touched.

Straightening Edge of Saw

Occasionally teeth become broken off completely, or it is desirable to straighten the edge of an old saw. In that event the saw is placed flat on the tool rest of a high speed grinder and the teeth ground off to the base of the broken tooth or to a line, as shown in Fig. 3. If only the teeth are broken, do not grind them off completely, but leave enough of each tooth to show the size and spacing. To grind them off completely would require laying out new teeth. New teeth need to be laid out if the blade is ground to a line as in Fig. 3.

The shape of the teeth is shown in Fig. 4. The fronts of the teeth are at an angle of 78° to the points of the teeth and the backs at 42°.

After a saw has been jointed it is likely to have an appearance as indicated in Fig. 5. It will be noted that the tips of teeth 2, 3, and 4 have been filed or jointed down to be in line with tooth No. 1 which has been filed lower than the others in a previous filing. To fit it, tooth No. 1 is left as it is. Both the front of tooth No. 2 and the back of tooth No. 3 are filed to bring both to points. Tooth No. 4 is filed to a point by filing from the front



(Fig. 5) Teeth of crosscut hand saw after jointing.

only. All teeth are thus brought to the same size and shape. The majority of saws brought into our shop for fitting have the teeth irregular in size and shape and the filer needs to use his judgment as he proceeds.

The size of file to use for any saw depends on the number of teeth to the inch. Fine saws such as eight, nine or ten point hand saws are filed with a six inch extra slim taper file.

The question is how to hold the file. If much filing needs to be done it has been found good practice to rough out the teeth by filing straight across the blade of the saw. That is, the space between points 2 and 3 is filed out by holding the file straight across as is done in filing a rip saw. The file must be held at an angle as shown by the shape of teeth in Fig. 4. The saw is placed down in the clamp so as to project not over ¼ inch. To have it project further would cause vibration and screeching.

After all teeth are roughed out and brought to a point the file is held at an angle of about forty-five degrees to file on the bevel. Some men file by pointing the file toward the tip of the saw and others prefer filing toward the heel. Both ways are right but the filer must be consistent and file both sides the same way. Those who file toward the heel hold that it is correct mechanically to file against the cutting edge as is done in grinding. Those who prefer filing toward the tip claim that the saw thus filed takes hold better and makes a smoother cut.

Left: (Fig. 6) Position to hold the file for filing a crosscut hand saw. **Right:** (Fig. 7) Setting a saw

The file as illustrated in Fig. 6 is held toward the tip. The number of strokes depends on the condition of the saw. If it has been roughed out as above suggested two strokes will file the bevels on the teeth. To those who do not do much filing it is suggested that they file the bevels on a few teeth then turn the saw end for end and finish the adjoining teeth on the other side, thus finding out just how much filing is needed to bring all teeth to the same shape and size.

File Before Setting, General Practice

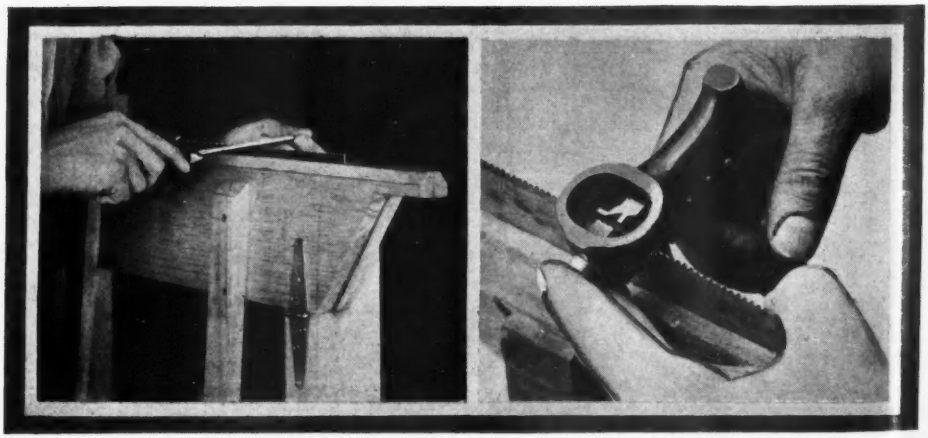
Theoretically, it is better practice to set the saw before filing but in fitting saws that are used in farm practice it has been found, in the majority of instances, that when the saw has been jointed the point that is to be set is filed away. Hence, in most instances, it is necessary to file the saw before setting.

So regulate the setting tool that it will set about half of the depth of the filed tooth. To set the whole tooth is likely to break off some of the teeth and make a saw kerf wider than necessary for the saw to draw freely in the wood. Every other tooth is set from one side as shown in Fig. 7, and then the saw turned end for end the other teeth set in the opposite direction in like manner.

Frequently a saw cuts too wide a kerf. This may be improved by placing the saw flat on a bench and side dressing it. This is done by drawing the flat side of a fine oil stone lightly lengthwise of the saw on each side.

A Farm Signal System

A call or signal system between farm buildings has proved a boon to the housewife and of outstanding convenience and service to the farm help. Such a system is readily installed by anyone with little study and makes an ideal project for the older farm boy. It consists of ordinary bell ringers or buzzers located in different buildings, interconnected by a wiring system energized from a six volt transformer or a set of dry cells, using anunciator cord to a push button panel in the house. By establishing a set of signals, any individual may be summoned to the house without the usual confusion.—*W. C. Kreuger, New Jersey Extension Service.*



Oil Burners for Comfort

(*Here from page* 12)

trically operated oil burners, too: there simply isn't any dirt connected with oil heating. Dusting is cut to a minimum; you have no ashes, no sooty coal dust, to bother you. It's not surprising that Faye Palmer says: "My wife is delighted. Her housework is much easier since all dust has been eliminated. The oil burner is a constant source of comfort and satisfaction."

"But," you want to know, "aren't oil burners dangerous? Haven't they been known to explode and set fire to things?"

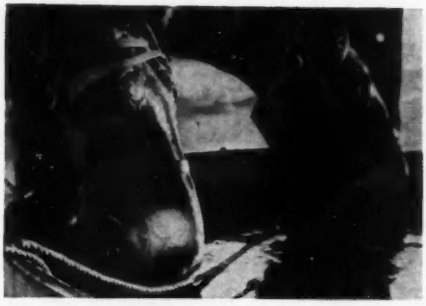
Oil burners *have* been known to explode, and they *have* set fire to things. But any properly installed and properly kept oil burner is far safer than the hand-firing you're using now. Every reputable oil burner is passed by the Underwriters' Laboratories, and is as safe as heating equipment can be made. You're far more likely to set fire to your roof by improperly heating your furnace with hand-firing than you are to set fire to your basement with a bursting oil burner.

When you have an oil burner in your basement, you can convert the coal bin into a playroom or a store room. In fact, you can convert the entire basement into a second or third floor for your house!

The picture that goes with this article is not a studio photograph. It is of an actual oil burner installation in New Jersey in a house very much like yours. This New Jersey resident has copied a city idea of covering the cement floor with rugs, decorating the walls with pictures, and introducing comfortable arm chairs. All that's needed for you to do the same is a covered basement floor, an oil burner, and a knack for interior decoration.

WE'LL all get more mileage out of life if we never shift our mouths into high gear until we're sure our brains are turning over.—*Anonymous.*

"I want one that makes buttered toast."



KEEP THEM IN GOOD CONDITION WITH...

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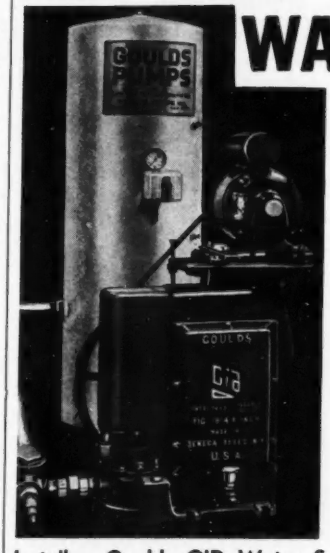

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Electrical HOUSEKEEPING

Conducted by GAIL MEREDITH

THE POT CALLS THE KETTLE GOOD

Your Pots and Pans Do Play an Important Part in Cooking with Speed and Economy on an Electric Range

THE pan should completely cover the burner. You really need to buy just enough heat to cook the food in the pan. And you might just as well use all you buy. If your pan covers the burner completely, there is no coil of wire outside the edges of the pan sending heat up into the air rather than into the dish of food. Wasted heat is just so much wasted current. You may be slowing up your cooking if the heat designed to cook the food is wasted heating the kitchen.

The pan must fit down tight on the burner to use the heat efficiently, too. If the bottom of your pan is warped so it leaves little air pockets between it and the burner, that will slow up the cooking. The longer it takes to cook your food, the more electricity you'll use, of course.

•

A GOOD pan to use with your electric range may be made of any metal you prefer; it may be enamel or the new top-of-the-stove cooking glass. It may be any weight you like, for tests have shown very little difference in the economy of using vessels of different weight. But remember that weight does tell in the wearing qualities of the vessel. The thicker the metal, the more durable it will be. Since a thick pan does not warp or buckle as soon as the thinner one, it will give longer service. Sides are straight in the new pans designed for use with an electric range because the vessel with the flaring walls has a greater surface to radiate and lose heat than has the vessel with the straight sides.

Shiny sides and dark or dull bottoms are the most efficient. Dark bottoms because they absorb heat more quickly than bright ones and so speed up the cooking. Shiny sides because they let less heat radiate out from the hot kettles.

I know it sounds very complicated, but the engineers who work these things out in household equipment laboratories with mysterious gadgets for

measuring the heat inside a kettle and outside a kettle, for timing to the flash of a split second when hot is really hot, say that this is the case. I'm all for believing them and buying accordingly.

•

THE cover should fit tightly. A tight fitting cover keeps the steam in, helps preserve flavors, and cuts down the cost of cooking. If you doubt this, watch how much longer it takes to bring water to a boil in an open kettle than in the same kettle with a good, tight cover on it. Then see how long the kettle will stay on the boil after you have turned the current off, that is, how long you can cook on stored heat, when you keep the cover on, and how you cut down that time if you take the cover off.

Try it yourself, by all means, but in case you don't get around to do it right way, let me tell you that engineering tests show that it takes 12 to 17% longer to bring that water to a boil in an open kettle. And they also point out—these figures will vary for different ranges—that a kettle will keep on boiling for fifteen minutes after you turn the current off if you leave the cover on, or a short two minutes if you lift off the lid. That gives you some idea of how much electricity you can save if your kettles have good, tight covers.

• • •

Keeping It New

IF you have a new electric range in your kitchen, you'll be anxious to keep it looking new as long as you can. That is really an easy job. What it amounts to is careful cleaning.

Turn off all the switches on your range and let the porcelain cool before you begin to clean it. You can wash it off with a damp soapy cloth. Since that porcelain finish is really glass like your dishes, if you want it unstreaked and shining, you will have to rinse it off with clean water, too.

Going on that good old ounce of prevention principle, wipe up spots as soon as you make them. That drop of milk, a gob of gravy, even a spatter of grease, you can wipe up in a jiffy while you are getting the meal.

If your range has open units, food spilled on

LET YOUR COWS DECIDE!

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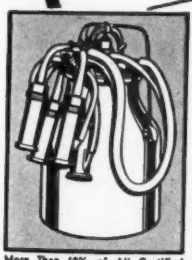

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See your De Laval Dealer for instructions and entry blanks for these interesting De Laval Contests. You do not need to be a De Laval user to enter. You may win a substantial cash prize. Get entry blank from local dealer.

A GIFT FOR EVERYONE: In addition, every qualified entrant will be sent a free copy of the famous pocket-size De Laval Diary and Farmer's Handbook as soon as entry is received at De Laval office. It has 146 pages of farm information and a large section for notes.

January (1939) Contest

Do you use hot water every twenty minutes during the day? No, I don't think I do, either; but that, engineers who poke around in statistics tell us, is the way it is needed, on the average of every twenty minutes throughout the day.

Anyhow, you probably use it pretty often, and maybe you'd like to enter our letter contest this month. No more than 500 words on the subject, "Why I would like an electric water heater."

We will pay $5.00 for the winning letter, and $1.00 apiece for any others we publish.

The letters must reach me by January 20, 1939. Address them to Gail Meredith, 1026 Seminole Highway, Madison, Wisconsin.

MY FAVORITE CAKE RECIPE

(Winning Letter for October Contest)

Have you ever heard of that hungry traveler called Donald Hines? He has written a careful directory of places to eat as you travel around the country, good places, good food. He calls it "Adventures in Good Eating". I just wish I could set that man down in front of some of the cakes made from recipes you sent in last October. That would give him something to shout about.

The cake I have chosen for you to try is a nut cake, the recipe sent in by Mrs. Jesse Smith from Ohio. I hope you will like it as much as I did.

* * *

Dear Miss Meredith:

I am sending you my favorite cake recipe. It is one that I make double for our church ice cream socials each year. The cake is always gone about as soon as it gets there, as there are people waiting for it. It is the favorite cake at all special occasions. We prefer caramel icing.

Maple Nut Cake

1½ cupfuls light brown sugar
½ cupful butter
2 eggs
½ teaspoon vanilla
¼ teaspoon maple flavoring
¾ cupful sweet milk
2 cupfuls cake flour
2 teaspoons baking powder
½ cup hickory nuts

Cream shortening and sugar together. Beat eggs, adding flavoring to eggs, and add this to sugar mixture. Sift flour and measure. Add baking powder, then sift 2 more times. Add flour and milk alternately. Add nuts—chopped up fine. Bake in a moderate oven.

MRS. JESSE W. SMITH,
R. R. 2, Miamisburg, Ohio.

them will char and burn up. You can brush the ash away with a soft brush. Closed units, you can wash as you do the rest of the cooking top. If you'll give them a rub now and then with a piece of clean, waxed paper, you will keep them new looking.

You can lift out the units to wipe around the edges of both unit and opening.

The drip tray under the units slides out so you can wash it at the sink. You know where yours is, don't you? I thought you did, but now and then we find a woman who uses a range for years without discovering that pan.

Wash out the oven often, and very thoroughly so that grease spattered on the walls, or food spilled over has no chance to get really burned on.

• • •

Fresh Pop Corn

THERE was a wind last night, and when I went to the door to call Shawn, the cat, I stood awhile to watch the little white clouds scud across the face of the moon. The snow was sweeping over the walk, and when Shawn came around the corner of the house, he had to lift his feet high and set them down lightly to avoid breaking through the thin crust below the drift of snow.

We shut the cold outside gratefully, and I said to Jess as I went over to lay a stick on the fire,

"This is just the kind of night for pop-corn. Who's going to make it?"

Jess put down the paper. "Funny you should say that just tonight. When I went in to pay my light bill this afternoon, I saw a corn-popping dohickey sitting on the counter there, and I thought it'd be a grand thing for Don to use when the Scouts are meeting here."

He got up and went out on the porch. "Hi, Don," he called, as he came back in, tearing the wrappings from a round, drum-shaped popper. "Here's a new kind of corn popper for you to try."

I liked it at once. It is easy to use and easy to clean up after. You know what I mean if you have pop corn lovers at your house. You plug in the cord, toss a handful of corn in the popper, and it pops in a jiffy.

"There was a woman in the store when I bought it," Jess said as we watched Don getting acquainted with the popper. "She said she put some butter and some goose grease right in the popper

and popped the corn in the hot fat. The directions on the popper don't say to do that, but she does it and likes it. We might try it some time."

• • •

Cherry Pie

Mix together a No. 2 can of cherries, three-fourths of a cup of sugar and three tablespoons of tapioca. Let these stand while you are making the pastry. Pour the cherry mixture into the pastry lined pan. Cover the pie with half inch strips of pastry placed criss-cross. Bake from 35 to 40 minutes at 425 degrees.

Child's Charlotte

1 cup hot milk
¾ cup sugar
¼ cup cold water
2 tbsp. gelatin
3 egg yolks
3 egg whites
2 cups cold milk
2 tsp. vanilla
dash of salt

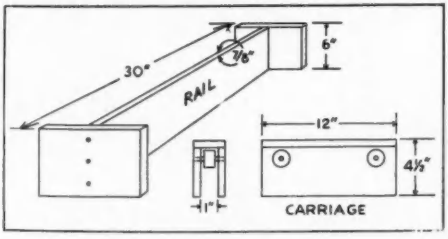
Soak the gelatin in the water. Make a custard of the hot milk, sugar, and egg yolks, cooking until eggs coat the spoon. Cool with cold milk. Add the gelatin and stir until dissolved. Beat egg whites and flavoring and add to above mixing with rotary egg beater. Pour into a fancy mold and when stiff, turn out and garnish.

A Helper For the Small Bench Saw

By HARRY L. GARVER

WITH the advent of small power bench tools which sell at a price within the reach of a moderate income, many farmers have purchased them for their shops. When sawing long boards on these small machines, the handling of the end of the board, particularly when cross-cutting, becomes a problem.

The little gadget shown in the sketch is quickly made and solves this problem very nicely. Cut a piece of planed 1 x 6-4½ ft. long and two pieces each approximately 1 ft. long and nail them to the ends as shown in the sketch. Next, make a carriage or slide of 1 x 4 about 1 ft. long as indicated on the drawing. The rollers may be made of casters attached to the upper board or, you may use large spools with spikes through them as



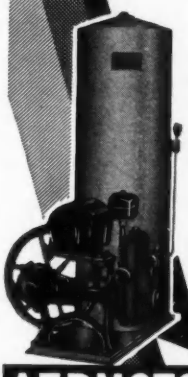
shown. Set the carriage astride the bar and you are ready to go to work. The carriage will roll more easily, if hard wood is used for the rail or a piece of strap iron is laid across the top and the carriage fitted with ball-bearing casters. Soft wood and spools will be satisfactory, however, unless there is much sawing to be done.

The rail must be supported on a table or saw horses at the proper height and distance from the saw, with the end of the board riding the carriage.

There's "REAL LIVING" WITH "RUNNING WATER"

● A cool tub or refreshing shower after a hard day's work! Stimulating and healthful, too! No convenience contributes more to *"real living"* than the bathroom equipped with running water. Enjoy *yours* regularly with an **AERMOTOR WATER SYSTEM.**

● If you are mechanically minded look "inside" an **AERMOTOR** Electric Pump. You will see quality construction everywhere, and numerous *exclusive* features, which insure many years of trouble-free pumping.



● Why not do as thousands of satisfied **AERMOTOR** owners have done? Examine an **AERMOTOR** *first.* See for yourself how much *more* **AERMOTOR** offers you for your money. Then put an **AERMOTOR WATER SYSTEM** on your job and *enjoy* running water.

Ask your Aermotor dealer for details.

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Dept. E-1
2500 Roosevelt Road, Chicago, Illinois

Gentlemen: Please send me a FREE copy of your "FACTS" Book about AERMOTOR WATER SYSTEMS.

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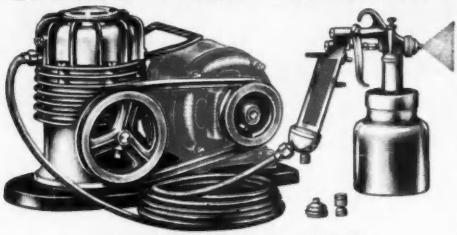

The NEW No. 885!

List Price only **$22** (without motor)

Completely new LOW COST outfit! Single diaphragm OIL-FREE compressor — never needs oiling! New internal-mix pressure-feed gun with oil and water trap in handle, oversize hardened steel nozzles, finger-tip control. Compact, portable, on one-piece steel base, uses ¼ h.p. motor. 2 nozzles (round and flat spray) and chuck for inflating tires. Other electric and automobile power spray outfits list from $2.60 up.

DEALERS: Send for new price list, discounts and details of LOW COST portable electric and auto-power paint sprayers.

W. R. BROWN CORP. Dept. C, 5720 Armitage Ave. Chicago, Ill.

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USES LESS CURRENT

Scientifically correct, with electric fan three-way air diffusion that cuts current cost 30 to 40%. Edge to edge silvered insulation. Head room for big founts. Bright gleaming 36-inch concave reflectors. Dual elements for safety. Steep, rigid canopy stays clean. 19-inch vent tube cuts heat loss. No room too cold. Write for folder on these sensational brooders.

THE MAKOMB LINE 103 MADISON AVENUE MACOMB, ILLINOIS

World's Largest Manufacturer of Brooders

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Send for valuable Free book, "FEED GRINDING for Profit on the Farm." See how much money you can save—see how much CASH Profit you can add to your farm income by owning a BELL HAMMER-TYPE MILL.

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The Bell Grinder not only grinds all kinds of grains, roughages, etc., at lowest possible cost, but also elevates at rate of 50 bu. per hour, up to fifty feet high, using only 1½ H.P. Motor. Made in 2 sizes, either electric or engine power. Get low factory prices. Write today.

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Dept. 21, Hillsboro, Ohio

ON THE AIR

Conducted by JEROME J. HENRY

New Tricks for Old Dogs

TEACHING an old dog new tricks is not as difficult as it's cracked up to be, according to Bob Becker, who broadcasts his experience with dogs over a nationwide network every Sunday.

Becker taught a six and a half year old dog the fundamentals, or, as he calls them, the two "R's" in a short time and without difficulty. The two fundamentals are Responding and Reclining, says Becker. The dog expert points out that training a dog to come when called and to sit down when told are the two most important things.

They should come first, he continues, because they teach a dog obedience and good manners. A dog which has learned the routine of obedience actually has a better chance to live in a world full of automobiles. Such a dog can be ordered out of the path of a car or made to mind other demands when given a sharp command. The untrained pet usually ignores commands.

• • •

Town Adopts Radio Star

WHEN Judy Canova, the number 1 radio hillbilly, first went on the air two years ago with Paul Whiteman, she picked on Unadilla, Georgia, as her home town. Ever since filling station proprietors, owners of hot dog stands, and even unsuspecting pedestrians along Unadilla's main street have been answering tourists' questions about Judy Canova, her sister Annie, and brother, Zeke.

Judy Canova, No. 1 hillbilly radio artist.

So pleased have Unadilla's citizens become over this attention that they have decided officially to

adopt Judy as one of them. The unique document of adoption which she has just received reads as follows:

Whereas, it has been brought to the attention of the Mayor and City Council of Unadilla, that the City of Unadilla has been, and is now being advertised, both far and wide, by Miss Judy Canova, one of the highest ranking radio stars in North America; and,

Whereas, her advertisement of our fair city is causing tourists from all over North America to stop and visit with us on their trips through this section: Therefore, the undersigned, Mayor and City Council of Unadilla, in a regular session officially adopts the said Miss Judy Canova as a resident of said city and hereby expresses to her the appreciation of the entire city for her citizenship and her great interest in the advancement of this community and hereby pledge our faith in her advancement, that she will, in the near future, head the list of radio stars in this Grand Old Commonwealth. City of Unadilla. (Signed by Mayor and Council.)

• • •

From Microscope to Microphone

COLD, scientific facts used to be Jeanne Juvelier's specialty. But now as a radio character actress, she is an expert at make-believe.

Behind Jeanne's expertness lies the story of a woman born to act—a woman who first sought to avoid her birthright by hiding it in a bacteriology laboratory.

Daughter of two great theatre stars, Jeanne owes her trek from microscope to microphone to both heredity and environmental influence. Her parents, both stage stars, wanted Jeanne to choose the stage for her career, but she chose instead a career in science which took her to New York University. There she got a science degree and eventually the post of technician in a biology laboratory.

Three years passed during which Jeanne saw her father and mother rise to great heights in the theatre. By 1924 the urge to become an actress was too great to resist. She joined a company and for eight years toured the country with Paul Muni and Sam Jaffe. In 1933 Jeanne made her debut in radio and since that time has gone steadily ahead, forging link by link the career she formerly avoided.

"I've learned by lesson now," she says. "Acting is my career—science my hobby."

• • •

Girl Bootblack Now Radio Star

LAST July was a happy month for Allene Cunningham, 17-year-old singer of Wichita, Kansas. It meant the end of her days as a bootblack and the start of her radio career.

Allene, who took a shoe-shining job in her father's barber shop in order to make enough money to pay for music lessons, made her network debut with Don McNeill, NBC master of ceremonies. On the strength of one performance she was given a contract. Allene's earnings as a radio singer are expected to insure voice lessons without any further necessity for looking up the shine brush and polish can again. She is particularly proud of a telegram of congratulations received from another Kansan, Marion Talley, Metropolitan opera star.

Thrill to the *Health-Protecting Time-Saving* Convenience of

THERMOGRAY
Automatic
Electric Water Heating

IMAGINE the joy of having all the piping hot water you want ready for instant use. Rural electrification and today's low electric rates are bringing clean, safe, dependable automatic electric water heating to thousands of farms.

Thermogray automatic electric water heaters make it easy to guard health and attractiveness by providing plenty of hot water for frequent bathing. Instant hot water saves the housewife many hours by speeding up work. Innumerable farm chores that require hot water are done more easily.

Thermogray tanks are large in diameter with high grade insulation securing low radiation losses. The heating elements are completely immersed in the water assuring 100% transference of heat to water—thus saving on current.

Some rural set-ups now provide a very low off-peak rate for electric water heating. Others are working toward this end. Find out if you have this special rate available.

Get full details on Thermogray heaters today. Contact your local utility company. Write to the manufacturer for free circulars.

THERMOGRAY CO.
Jefferson, Iowa

QUESTIONS and ANSWERS

Rewiring a Motor

Question: *Where can we buy a book or plan for rewiring a ¼ h.p. split-phase motor?*
S. B., Minn.

Answer: "Armature Winding" by D. P. Moreton, 204 pp., 232 illns., $2.00. Popular Mechanics Press, Chicago. We do not advise home rewinding of motors unless you are just doing it because you like to. It is a factory or motor shop job to make them run right, and a rewind job on a ¼ h.p. split phase motor will cost almost as much as a new motor.

Who Makes Prisms?

Question: *Will you please advise me of the addresses of dealers or manufacturers of glass crystals, known as prisms, which are used for chandeliers? We have some old hanging lamps wired for electricity and some of the prisms are missing.* G. F. S., Washington.

Answer: The Woolworth ten cent stores carry several sizes of these prisms in their New York stores. We have been unable to locate a manufacturer. Most of them come from Czecho-Slovakia and imports have stopped. The DeSilva Co., manufacturers of lighting fixtures, 171 E. 33rd St., New York City, may be able to match your prisms.

32-Volt Light Plant for Arc Welding

Question: *Please send me information on conversion of a 32-volt light plant into an arc welder. If possible, send wiring diagram.*
C. G., Ind.

Answer: Here is what a light plant manufacturer says about it: "In general, this is not a practical thing for our equipment because the majority of our machines are battery charging, shunt wound generators and are naturally not a low potential high current type of generator. Then, too, the average plant is less than 1500 watts and we are told that for such welding work, more power is required."

Pump Booster for Gravity Water

Question: *We have a cistern about 300 ft. from dwelling. Water runs by gravity, having about 20 ft. fall. ¾ in. galv. pipe has been in use 20 yrs. Can an electric pump be installed in the cellar to boost the quantity and build up pressure? What size pump? Would a rotary, centrifugal or piston type be best?* L. S. W., Pa.

Answer: A shallow well water system in the cellar will be a satisfactory booster of both quantity and pressure,—providing your ¾ in. pipe is not too badly corroded or obstructed. If your present gravity flow (measure with a bucket and watch) is less than 2 gal. per minute, the pipe should either be cleaned or replaced. Use a 250 gal. per hr. pump with ¾ in. pipe, or if you want 350 gal. per hr., use 1 in. pipe. Any type pump will work, piston or turbine preferred.

Electric Room Heating

Question: *Is there any good way, at reasonable expense, of heating by electricity a bedroom 12 x 15 x 9 ft.? At what cost?* Mrs. A. J. M., Ind.

Answer: It would be possible to take the chill off this room with a 1,000 to 1,500 watt fan type room heater or to warm sections of it by directing an ordinary radient type heater at them. For a real heating job, however, assuming frame construction and average exposure and a room temperature 50° above the outside air, you would

(*More on page 26*)

ASK FOR IT...IT'S FREE

As a reader of ELECTRICITY ON THE FARM you are entitled to our buyers' information service free of cost. When seeking information about equipment or material that you plan to buy, first look through the advertisements in this issue. They are your best guide. Then, if you do not find what you want, just use the blank below to tell us what you need and we will see that you get the information you want. . . . It costs absolutely nothing.

USE THE COUPON—TODAY

ELECTRICITY ON THE FARM
Readers' Service Dept. 24 W. 40th St. New York

Without cost to me, please have manufacturers send complete information on the following Electrically Operated Equipment which I am thinking of buying:

.....

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My name is .....

Address .....

I get electricity from .....

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IS SAFE—Eliminates Fire Danger and Loss
SAVES TIME AND WORK—Eliminates Many Chores, Requires Less Attention
MAKES MONEY—Better Grown—Stronger—Heavier Birds
CAN BE USED ANY TIME—ANYWHERE
Write today for Free Bulletin 1000S

The Trumbull Electric Mfg. Co. 1012 Woodford Ave. Plainville, Conn.

Reviewed by T. E. HIENTON

Names and addresses of manufacturers of the articles described in this column will gladly be furnished upon request to What's New Department, ELECTRICITY ON THE FARM, *24 West 40th Street, New York, N. Y.*

Electrical Chimes

When neighbors come now, they can call you to the door with deep, rich musical tones instead of the conventional door bell. Made in a number of models with one to four tones at from $2.75 to $50, these chimes operate with push buttons like door bells, and are good to listen to.

Dualectric Range

This range cooks, heats and bakes with electricity, coal, wood or oil. The four outside top plates are electric, one being a deep-well thrift

cooker. The four inside plates are over the fuel burning part of the stove. Start a fire, open the left door and heat the kitchen. The right hand door is the oven door. The oven is insulated and has thermostatically controlled electric heat, or it can be heated with coal, wood or oil, or preheat it with fuel and bake with thermostatically controlled electric heat. The oven also contains an electric speed broiling unit. The range is listed by the Underwriter's Laboratories.

Triplet Grinder, Chopper, Shredder

One of the old, established hammer mill makers has just come out with a new universal grinder which will grind grain, ear corn, roughage, roots, ensilage or compost. In external appearance it looks like an ordinary hammer mill and blower elevator. It is used this way for grinding grain, snapped corn, bundle grain and roughage. To cut ensilage and roots or vegetables, remove the screen, replace the hammers with knives and reverse the

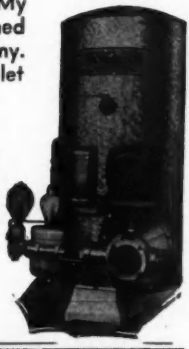
WHAT! Me Carry Water for 1½c per 24 Hour Day?

That's what you'll have to do to compete with me—I'm a Uniflow Shallow Well System with 42 gal. tank. Water travels thru me in one direction — that's how I got my name—Uniflow.

I oil myself—I start myself — I stop myself. My motor is especially designed for quietness and economy. I'm tough and I never let you down.

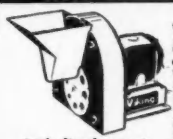
I will come to you for $70.00, or will send you one of my big or small brothers for $48.00 and up. When do we go to work?

$70.00 for P-250 System with 42-gal. tank and 250-gallon per hour pump, including automatic switch, relief valve, air volume control and fresh water valve.



UNIFLOW MFG. CO.
1567 E. LAKE ROAD
ERIE, PENNA.

GRIND YOUR OWN FEED
SAVE 90% ON YOUR GRINDING COSTS
WITH VIKING HAMMER MILLS



Many farmers report costs below ten cents per ton. The Viking Junior Hammer Mill is fully automatic. Grinds while you are doing other chores. Can be plugged into any convenient 110 or 220 volt service outlet and the half horse power motor will grind up to 700 pounds per hour. With a Viking Mill you can grind your own feed when and as you want it . . . and always have it fresh.

Agricultural experts emphasize the greater nutrition value and increased yield of FRESHLY GROUND grain. Feed ground fresh with a Viking Mill will make profits for you and lessen danger of spoilage. One farmer says:

"Received Viking Junior Hammer Mill O.K. I like the mill fine. I grind feed for 6 cows and crack corn for 125 chicks. The feed is fresh and cows give more milk on the same amount of feed. The gain was about two gallons for 6 cows. . . ."
Signed . . . Lloyd Jacobs Streator, Illinois.

Write for full information.

VIKING MANUFACTURING CO., Jackson, Mich.

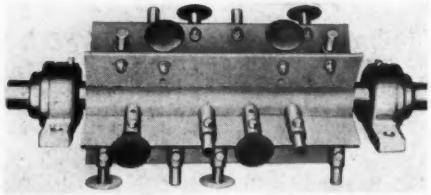
LOWER CURRENT CONSUMPTION
With an ANDERSON "Even-Heat"
ELECTRIC BROODER

Here's a money-saving electric brooder . . . . that will brood your chicks in comfort. Roof is designed to deflect heat to all parts of the brooder. No hot spots. Positive air circulation. Double shell provides better insulation. Priced as low as $8.90.

Free Catalog
Write today for your copy and low prices. Write Dept. 150

ANDERSON BOX CO.—INDIANAPOLIS, IND.

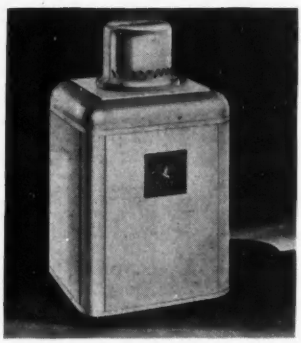
hood so as to feed into the opposite side of the mill. The knives then work against a strike plate as in an ensilage cutter. In the third position the blower belt is removed, a pan substituted for the



screen and a side discharge plate opened. This is the setting for grinding manure, leaves, soil and sand for making compost. It may also be used this way for grinding roots and vegetables. The Triplet cylinder is shown in the illustration. Cutter knives are round. The cylinder blades give a supplementary fan action which helps prevent clogging. Requires a motor of 7½ h. p. or larger when using the blower or 5 h. p. without the blower.

Electric Ice-Cream Freezer—Plus

Here's something new in ice-cream makers. Makes ice-cream quickly, keeps it hard for 18 hours; and when not being used for ice-cream, it may be used as an ice bucket, vegetable preserver, water cooler, picnic pack box, or camp refrigerator. These are some of the claims made for this new electric appliance. It has a Permatol treated pine tub and insulating crown, an A. C. motor which drives through gears, a white enamel finish and rubber feet. Made in 2, 4 and 6 qt. sizes at $12.75, $16.75 and $22.75.



New Publications

"SHALLOW-WELL WATER SYSTEM," Extension Bul. 392, Cornell University, Ithaca, N. Y.

"WINNERS," a sound slide film for school children. Good vs. bad lighting narrated by Ed Thorgensen, sports commentator. 95 pictures. $10 for film and record. National Better Light Better Sight Bureau, 420 Lexington Ave., New York.

"LOCKER REFRIGERATION," Publication 215, University of Tennessee, Agricultural Extension Service, Knoxville, Tennessee, September, 1938.

"HOME FREEZING UNIT," Bulletin 241, State College of Washington, Agricultural Extension Service, Pullman, Washington, March, 1938.

Questions and Answers

(*Here from page 24*)

need a 4 kw. heater. The heater would cost from $15 to $40 and would use possibly 30 kwh. per day in freezing weather. This might be economical for occasional heating. In northern climates, electricity can hardly compete with other fuels as yet on a cost basis.

Shallow or Deep Well Pump

Question: *I have a well 310 feet deep. The water from the well is gradually decreasing. I have in mind buying an electric water pump. What would be your advice as to buying a shallow well pump or a deep well pump?* G. J., La.

Answer: I would recommend a deep well pump for your water system. If the water in your well is falling now you will probably find that with the convenience of an automatic water system you will use more water and the draw down will be still greater. You will be on the safe side if you use a deep well system.

To Heat Water—A Correction

On page 24 of the October issue it was stated: "Under actual test one kwh. of electricity warms 6 gallons of water from 65° to 150°." It should have been 3.6 gallons; that included heat losses. Water heater thermostats are often set at 120°. At this setting 4 to 5 gallons are heated per kwh.

THE talent of success is nothing more than doing what you can do well; and doing well whatever you do, without a thought of fame.
Longfellow, Hyperion. Bk. 1, Ch. 8.

HE who sows the ground with care and diligence acquires a greater stock of religious merit than he could gain by the repetition of ten thousand prayers.
Zoroaster.

CLASSIFIED ADVERTISING

INCREASE YOUR PROFITS BY USING LYON ELECTRIC POULTRY SUPPLIES. Get the results of twenty-four years of specialized experience. Send for free literature on money-saving brooders, parts for homemade equipment, burglar and power shortage alarms, ventilators, incubators, fly electrocutors. Advisory service without obligation. Write today listing your requirements. It will pay you. LYON RURAL ELECTRIC CO., Dept. EF, San Diego, Calif.

WRITE FOR FREE COPY of Bussey's Book for Poultrymen. Low prices on parts for electric brooders and batteries. Complete heating assembly—factory price only $2.75. BUSSEY PEN PRODUCTS COMPANY, 5151 West 65th Street, Chicago, Illinois.

FREE—BROWER'S New big 100-page Poultry Supply Catalog and Guide. Shows largest line of poultry equipment in world—all at new low prices. Over 425 items, including electric waterers, brooders, incubators, feed mixers, broiler batteries. Write today. Brower Mfg. Company, Dept. N-39, Quincy, Ill.

The 1939 SERKUL-HEAT ELECTRIC BROODER presents a new principle in heat distribution and air circulation—no fans. Extremely economical in operating cost by Utilities Company test. LOW INITIAL COST. Before you buy a brooder, get our descriptive circular on SERKUL-HEAT BROODERS. 2 sizes. Users praise it highly. POULTRY AID PRODUCTS CO., 129 Norris Bldg., Grand Rapids, Mich.